

**Five-Year Review Report
General Motors (Central Foundry Division) Superfund Site
St. Lawrence County
Town of Massena, New York**

Prepared by:

**United States Environmental Protection Agency
Region 2
New York, New York**

July 2005



139712

EXECUTIVE SUMMARY

The first five-year review for the General Motors (Central Foundry Division) Superfund site, located in the Town of Massena, St. Lawrence County, New York, was completed. Currently the implemented portions of the remedy are functioning as intended by the decision documents and are protecting human health and the environment.

Five-Year Review Summary Form

SITE IDENTIFICATION

Site Name (from WasteLAN): General Motors (Central Foundry Division) site

EPA ID (from WasteLAN): NYD091972554

Region: 2

State: NY

City/County: Town of Massena/St. Lawrence County

SITE STATUS

NPL Status: ☒ Final ☐ Deleted ☐ Other (specify) _____

Remediation Status (choose all that apply): ☒ Under Construction ☐ Operating ☐ Complete

Multiple OUs? ☒ YES ☐ NO

Construction completion date: N/A

Are portions of the site in use or suitable for reuse? ☒ YES ☐ NO ☐ N/A

REVIEW STATUS

Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency _____

Author name: Anne Kelly

Author title: Remedial Project Manager

Author affiliation: EPA

Review period: 7/27/00 - 7/27/05

Date(s) of site inspection: 7/11/05

Type of review:

- ☐ Post-SARA ☐ Pre-SARA ☐ NPL-Removal only
☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead
☐ Regional Discretion ☐ Policy ☒ Statutory

Review number: ☒ 1 (first) ☐ 2 (second) ☐ 3 (third) ☐ Other (specify) _____

Triggering action:

- ☒ Actual RA Onsite Construction at OU #1 ☐ Actual RA Start at OU #
☐ Construction Completion ☐ Previous Five-Year Review Report
☐ Other (specify) _____

Triggering action date (from WasteLAN): 7/17/00

Due date (five years after triggering action date): 7/17/2005

Does the report include recommendation(s) and follow-up action(s)? ☒ yes ☐ no

Is human exposure under control? ☒ yes ☐ no

Is migration of contaminated ground water stabilized? ☐ yes ☒ no ☐ not yet determined

Is the remedy protective of the environment? ☒ yes ☐ no ☐ not yet determined

Acres in use or suitable for use: restricted: 19 unrestricted: 251

Five-Year Review Summary Form (continued)

Issues, Recommendations, and Follow-Up Actions

Access restrictions need to be implemented to prevent potential employee exposure to contaminated surface soils located on the East Disposal Area (EDA) and North Disposal Area.

Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls

The selected remedies have not been fully implemented. While the Environmental Protection Agency (EPA) is confident that the selected remedies are protective of public health and the environment, there is public opposition to the containment remedies selected for the EDA and the Industrial Landfill (ILF). Specifically, the St. Regis Mohawk Tribe (SRMT) objects to the containment of these unlined landfills in close proximity to the border with Tribal lands. EPA believes that the containment remedy for the landfill and the excavation and containment remedy for the EDA, in combination with the implementation of ground water controls, will eliminate the potential for exposure from these units. Given the Tribe's objections, however, EPA continues to work with both the Tribe and General Motors, the potentially responsible party, to determine whether a remedy can be developed which is acceptable to both parties.

In addition, contaminated soils and sediments are located on two privately-owned, unfenced, and uncontrolled properties located on SRMT lands that have not been remediated due to the inability to obtain access. EPA continues to work with the Tribe in order to obtain access to complete this action.

New York State now requires annual certifications that institutional and engineering controls that are required by RODs are in place and that remedy-related O&M is being performed. Annually, General Motors will need to certify that the institutional and engineering controls are still in place and that remedy-related O&M is being performed.

Protectiveness Statement

The implemented actions at the site protect human health and the environment in the short-term. The remedy will be fully protective once the remaining remedial measures called for in the RODs are implemented.

I. Introduction

This is the first five-year review for the General Motors Central Foundry (GM) site, located at the GM Powertrain manufacturing facility in the Town of Massena, St. Lawrence County, New York and was conducted by Environmental Protection Agency (EPA) Remedial Project Manager (RPM) Anne Kelly. The review was conducted pursuant to Section 121 (c) of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended, 42 U.S.C. §9601 *et seq.* and 40 CFR 300.430(f)(4)(ii) and in accordance with the Comprehensive Five-Year Review Guidance, OSWER Directive 9355.7-03B-P (June 2001). The purpose of five-year reviews is to ensure that implemented remedies protect public health and the environment and that they function as intended by the site decision documents. This report will become part of the site file.

A five-year review is required at this site due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

The trigger for this five-year review is the on-site construction start associated with the inactive lagoons.

II. Site Chronology

Table 1 (attached) summarizes the site-related events from discovery until the present.

III. Background

Site Location

The GM site, located on the St. Lawrence River approximately 7 miles east of the Village of Massena, New York, is situated approximately 2 miles south of the City of Cornwall, Ontario, Canada. Land use in the area surrounding the site is a mix of residential and industrial.

The site is bordered on the north by the St. Lawrence River, which is the international border with Canada. The property immediately west of the GM plant is owned by the St. Lawrence Seaway Corporation, New York State Department of Transportation (NYSDOT), and Alcoa, Inc. Tribal (SRMT) lands, known as Akwesasne, are located to the east, and Route 37 and the Raquette River are situated to the south. Figure 1 identifies the site's location.

Physical Characteristics

The GM Powertrain manufacturing facility is located on approximately 270 acres of industrial and undeveloped land located in an otherwise rural area. The GM site consists of several discrete areas of contamination on this property. There are three disposal areas—the twelve-acre Industrial Landfill (ILF); the North Disposal Area (NDA); and the East Disposal Area (EDA). All three areas contain contaminated soils, debris, and waste materials. There are four industrial lagoons that contain or have contained PCB-contaminated liquids, sludges, and soils. The site also includes sediments from the St. Lawrence River, soils and sediments from the Raquette River, on-site soils, and Turtle Creek and Turtle Cove (also referred to as “Tribal soils and sediments”). See Figure 2.

Site Geology/Hydrogeology

Ground water flow through the site generally reflects the surface topography, flowing primarily to the north toward the St. Lawrence River, with shallower units exhibiting a strong northeastern component. Bedrock is not exposed at the GM site. The nearest outcropping of bedrock is found three miles to the South near Helena, NY.

Over most of the site, there is a downward hydraulic gradient from the overburden to the bedrock. The reverse is the case for the area within 300 feet of the St. Lawrence River, where potentiometric heads in the overburden are the lowest at the Site and the heads are higher in the bedrock, indicating an upward flow from bedrock to overburden. Overburden ranges from 60- to 120-foot in thickness at the Site. There are eight stratigraphic units overlying the bedrock at the Site. These are dominated by glacial tills, clays, and sandy depositional units.

Within the three distinct till layers on-site there can be found silts, clays, sand and gravel as well as thin discontinuous layers of sand or gravel. These till units exhibit low permeability (10^{-6} cm/sec - 10^{-7} cm/sec). A large percentage of the ground water flow at the site is confined to one layer, the upper glaciolacustrine unit, which is found at depths of 30-40 feet below the surface. While this unit has a considerably higher permeability (10^{-3} cm/sec) than the others on-site, it is confined beneath by low permeability glacial till. It occurs only on the northern part of the site within 13,000 feet of the St. Lawrence River and east of the 10 million-gallon lagoon. The glaciolacustrine unit is surrounded by low permeability tills to the west, east and south. The St. Lawrence River is a receptor for ground water and there is also limited shallow ground water flow southward toward the Raquette River.

The ground water at the site is classified by New York State as a drinking water source; however, ground water at the GM site is not used for drinking water or any other purposes.

Land and Resource Use

The GM site is an active manufacturing facility and is zoned industrial. Some areas of contamination are found beyond GM's property on residential SRMT lands. All residences within close proximity to the site receive their water from a Tribal public drinking water supply line (surface water source).

There are approximately 35 homes along the GM/Tribal border. The closest homes to the site are situated on the shore of the recently-remediated Turtle Cove and Turtle Creek. The St. Lawrence River represents the international border with Canada and is an active marine shipping thoroughfare for ships traveling to and from the Great Lakes through the nearby Eisenhower locks. It is also used for recreational boating. The Raquette River to the south is primarily used for recreational purposes. The property immediately west of the GM plant is property owned by the St. Lawrence Seaway Corporation, NYSDOT, and Alcoa, Inc.

History of Contamination

The facility was originally built as a die-casting plant to produce aluminum cylinder heads for the Chevrolet Corvair in 1959. Polychlorinated biphenyls (PCBs) were used as a component in

hydraulic fluids to provide protection from fire and thermal degradation associated with the high-temperature, high-pressure environment of die-casting machines. EPA banned the use of PCBs in 1977, at which time GM began to phase out their use in plant processes. In their place, GM substituted non-PCB-containing mineral-based oils. In the mid-1980s, GM ceased die-casting operations at the facility, but continued operations on a smaller scale, casting aluminum parts through a procedure known as the lost-foam process. GM also began to cast iron parts using this process in the mid-1990s. The facility began producing new engine block and head motor components which, starting in 1996, returned the facility to near-capacity production levels.

PCBs are the primary contaminant of concern in all media; however, phenols and volatile organic compounds (VOCs) have also been found at the site. Much of the contamination at the facility and surrounding areas can be attributed to the handling and on-site disposal of contaminated wastewater sludges as follows.

Lagoons

Four unlined industrial lagoons, referred to as the 350,000-gallon lagoon, the 500,000-gallon lagoon, the 1.5 million-gallon lagoon, and the 10 million-gallon lagoon, were used to process industrial wastes containing PCB-contaminated liquids, sludges, and soils.

North Disposal Area

The NDA is a subsurface area located adjacent to the 1.5 million-gallon lagoon. It is comprised of three distinct areas—a buried interceptor lagoon and two disposal pits. PCB-contaminated sludges and debris were placed in the NDA during the course of plant operations. Sampling at the NDA has indicated that there are high levels of PCBs (6,780 mg/kg) at depths of approximately 45 feet. Also, phenols have been detected in the NDA.

Industrial Landfill

The ILF is a twelve-acre disposal area in the plant's northeast corner. The ILF contains plant contaminated foundry sands, debris, and PCB-contaminated sludges. VOCs, phenols and phthalates have also been detected in the landfill (an interim cap was constructed 1987-1988).

East Disposal Area

The EDA is unlined and was formerly used to dispose of construction and demolition debris, as well as wastewater treatment sludges. In 1975, the failure of a containment berm surrounding the EDA caused water and other materials to flow eastward onto SRMT property. Visible spill material on Tribal property was excavated and transported to GM property.

St. Lawrence River

The St. Lawrence River was contaminated through direct discharge of PCB-contaminated wastewaters through an outfall pipe and through overland surface water runoff. Approximately 10 acres of the St. Lawrence River at the GM site were contaminated in this manner.

Raquette River

In 1970, PCB-contaminated soils excavated during a plant expansion were placed on the north bank of the Raquette River. Sediments in the Raquette River were contaminated through direct discharge via an outfall pipe from the plants as well as from surface water runoff from contaminated bank soils.

Tribal Land Soils and Sediments

Tribal land soils were contaminated during a failure of a containment berm surrounding the EDA. Sediments in the three-acre Turtle Cove were contaminated through the runoff of contaminated surface soils and subsurface discharge from the ILF.

Initial Response

The GM site was placed on the Superfund National Priorities List in September 1983 as a result of contamination related to GM's past waste disposal practices.

Significant upgrades were made to the wastewater treatment system in the early 1980's to reduce discharge of PCBs through the plant's outfalls. This included recycling over 90% of plant wastewater and installing carbon treatment prior to discharge in order to significantly reduce the discharge of PCBs to the rivers.

In order to reduce direct exposure and prevent runoff to the St. Lawrence River, from 1987-1988, as an interim measure, the ILF was capped with one foot of clay, soil, and was seeded. Access restrictions, including site fencing, were put in place at that time.

Until 1988, GM collected stormwater from the southern side of the plant and discharged the water through a storm sewer line which once lead to the Raquette River. In late 1988, GM modified the underground lines to redirect collected surface water to the 10 million-gallon lagoon, which is subsequently treated by the plant's water treatment system before being discharged to the St. Lawrence River. The storm sewer line leading to the Raquette River was sealed at a manhole near the GM plant.

In 1992, pursuant to a Unilateral Administrative Order (UAO) (Index No. II CERCLA-20207) issued by EPA, GM took measures to ensure that materials containing PCBs were not conveyed from the storm sewer line leading to the Raquette River located on the north side of Route 37. Specifically, a brick and mortar bulkhead was built in the 36-inch diameter influent pipe at the catch

basin on the north side of Route 37. In addition, the pipe and catch basin interiors were cleaned and sealed with grout and improvements were made to the concrete spillway.

The 10 million-gallon lagoon and the 500,000-gallon lagoon are currently an active part of the plant's wastewater treatment system. As part of its ongoing operation and maintenance (O&M) of these lagoons, GM has removed a considerable amount of PCB-contaminated sludges from these lagoons.

Basis for Taking Action

In 1985, GM entered into an Administrative Order on Consent (Index No. II CERCLA-50201) with EPA to perform a remedial investigation and feasibility study (RI/FS) to determine the extent to which PCBs were present in the soil, ground water, and sediments. The RI was completed in June 1989; the FS was completed in November 1989.

Based on the information provided by the RI and FS, EPA determined that the PCBs, VOCs, and phenols in surface water, soil, sediment, and ground water present both a potential human health and ecological risk.

IV. Remedial Actions

Remedy Selection

EPA has issued two Records of Decision (RODs) for the site. The first ROD, which was signed in December 1990, addressed contamination in the St. Lawrence River, GM on-site soils, SRMT soils and sediments, the NDA, the Raquette River, surface water runoff, contaminated site-wide ground water and the industrial lagoons. The major components of the remedy include:

- Excavate and treat SRMT soils greater than 1 milligram per kilogram (mg/kg) PCBs;
- Dredge and treat St. Lawrence River sediments greater than 1 mg/kg PCBs;
- Dredge and treat Raquette River sediments greater than 1 mg/kg PCBs;
- Excavate and treat Raquette River bank soils greater than 1 mg/kg PCBs;
- Dredge and treat SRMT Sediments greater than 0.1 mg/kg PCBs;
- Excavate and treat miscellaneous site soils greater than 10 mg/kg PCBs;
- Excavate and treat North Disposal Area soils greater than 10 mg/kg PCBs;
- Excavate and treat Industrial Lagoons soils greater than 10 mg/kg PCBs;
- On-site treatment of greater than 10 mg/kg PCBs; on-site disposal of treated wastes;
- On-site treatment of surface water runoff in the EDA; and
- Extraction and treatment of contaminated site ground water.

The second ROD was signed in March 1992; it addressed contamination in the ILF, EDA, and the contaminated ground water that flows beneath those areas. The major components of the remedy include:

- Upgrade Industrial Landfill interim cap;
- Excavate and treat East Disposal Area soils with concentrations greater than 500 mg/kg PCBs, oily soils, and sludges; and
- Containment, extraction and treatment of contaminated ground water under ILF and EDA.

In April 1992, EPA issued a UAO to GM (Index No. II CERCLA-20207) to undertake the design and construction of the remedy selected in the 1990 ROD. In August 1992, EPA issued a UAO to GM (Index No. II CERCLA-20215) to undertake the design and construction of the remedy selected in the 1992 ROD.

Both RODs indicated that the method for on-site treatment would be determined through a treatability study. Based on the results of the treatability studies, in 1995, EPA issued a “Post-Decision” Proposed Plan which identified thermal desorption as the preferred treatment technology for contaminated materials and proposed the designation of a Resource Conservation and Recovery Act Corrective Action Management Unit to contain the contaminated materials at the site. The 1995 Proposed Plan also recommended that the treatment level for contaminated materials be raised to 500 mg/kg PCBs from 10 mg/kg.

Although the modifications to the remedy called for in the 1995 Proposed Plan was fully protective of human health and the environment and in compliance with EPA policies and regulations, EPA determined that based on public opposition, a shift in the remediation strategy was warranted. In August 1998, EPA officially withdrew the 1995 Proposed Plan with the issuance of a new plan which was largely accepted by the public. The 1998 Proposed Plan resulted in a March 1999 ROD amendment, which allowed for the off-site disposal (rather than on-site treatment with on-site disposal) of St. Lawrence River sediments, Raquette River sediments, soils excavated during the installation of the ground water control system, as well Tribal soils and sediments.

Additionally, in April 2000, EPA further modified the first ROD (Operable Unit 1 [OU1]) and issued an Explanation of Significant Differences (ESD) allowing for on-site treatment (via solidification) and off-site disposal rather than on-site treatment (via thermal desorption) and on-site disposal of materials excavated from the inactive lagoons. This plan moved forward with overall community and Tribal support.

Remedy Implementation

St. Lawrence River

In addition to the early abatement actions listed above, the first step in GM’s multi-phase approach to remediation of the site was the remediation of the St. Lawrence River. The dredging of the St. Lawrence River sediments was ready to begin in 1994. However, since the silt curtains that were deployed as the sediment containment system were unable to withstand the currents in the St. Lawrence River, the dredging was postponed while the sediment containment system was redesigned. The redesigned system consisted of interlocking steel sheet pile panels which completely

enclosed the area to be dredged and greatly reduced the potential for off-site migration during the dredging.

GM began dredging in June 1995 and ended operations in late November of the same year. In all, GM dredged approximately 10 acres in the St. Lawrence River, removing over 13,000 cubic yards (cy) of sediment. Although GM successfully removed over 99% of the PCB mass in the sediments, it was unsuccessful in meeting the cleanup goal of 1 mg/kg PCBs at every location. Despite multiple attempts to eliminate the contamination in the immediate vicinity of the outfall, the PCB levels continued to exceed the cleanup goal. For this reason, a multilayer cap was placed in the St. Lawrence River over a 2-acre area, which reduced the surface concentrations of PCBs in the capped area to less than the 1 mg/kg PCB cleanup goal. The average PCB concentration in the remaining 8 acres (3 mg/kg) was marginally above the cleanup goal.

Surface Water Control

The 1990 ROD required that GM take measures to prevent surface water runoff onto Tribal lands and minimize the movement of contaminated surface soils from the GM facility. In 1995, GM completed this effort. The soils in the area of the EDA were re-contoured and re-vegetated directing any surface waters to a newly constructed 1.5 million-gallon storm-water lagoon and treatment system.

Inactive Lagoons

The first portion of remedial activities for the lagoons involved solidifying the sludge in the 350,000-gallon lagoon. This work proceeded without the health-based air action levels for PCBs or dust particulates being exceeded until the third week. At that time, GM, EPA, and the SRMT government agencies received complaints from plant employees and nearby residents about dust and odors. The work was suspended and GM constructed a temporary enclosure over the lagoon in which solidification activities for the treatment of materials from both the 350,000-gallon lagoon and the 1.5-million gallon lagoon could take place. The structure allowed the solidification of the materials from both lagoons to move forward, by capturing and treating air emissions thereby preventing air impacts to the plant workers and the surrounding community. On-site treatment of materials from the inactive lagoons took place from July 24, 2000 through June 18, 2001.

After the removal of sludges from the lagoons, GM began excavation of contaminated soils to the 10 mg/kg PCB on-site cleanup level. Excavations were performed where data indicated that the cleanup level had been exceeded or wherever visually-stained soils were found.

A total of 19,605 cy of treated sludges and soils were removed from the site as part of this effort and were shipped via rail car to an approved hazardous waste disposal facility.

Not all of the contaminated soils could be removed from the areas adjacent to the 350,000-gallon lagoon due to stability issues associated with the soil's close proximity to active plant structures. A localized ground water collection system was installed in this area in the November 2003 and is described below.

The 350,000-gallon lagoon was backfilled, retrofitted with a liner and is now used as a process water lagoon and a part of the plant's wastewater treatment system. The 1.5 million-gallon lagoon was also backfilled, lined, and put into service to collect and hold storm water.

Ground Water

The 350,000-gallon lagoon lies immediately adjacent to the GM wastewater treatment building and is also in close proximity to a number of vital plant utility lines and an active water tower. Given the physical constraints, excavation was limited on the western side of the lagoon in order to protect the structural integrity of the wastewater treatment building and the water tower. Since the 10 mg/kg PCB cleanup level could not be met in this area, EPA directed GM to construct a localized ground water collection system at the location of the 350,000-gallon lagoon. Ground water at this location is collected and treated in the plant's wastewater treatment system. The ground water collected in this sump was sampled for PCBs, VOCs, and phenols three times in February 2004 and once in June 2005. The first sample had the only detection at 2.17 micrograms per liter ($\mu\text{g/L}$) PCBs. A ground water monitoring well will be installed at this location for regular monitoring.

Similarly, a ground water collection sump was put in place at the area northeast of the industrial landfill (NEILF) after the excavation of contaminated soils there (see "Soils North East of the Industrial Landfill," below). This sump collects ground water at the northeastern part of the ILF and transfers it to the plant's wastewater treatment system. The sump was sampled in February 2005 and May 2005. The February 2005 analysis shows PCB ground water levels at 1.04 $\mu\text{g/L}$. Validated data results for the May 2005 sampling event are not yet available.

Both of these efforts ensure the protectiveness of the remedy by reducing the potential for migration of contaminants through the ground water in these localized areas.

Raquette River

The remediation of the Raquette River PCB-contaminated bank soils and river sediments began in June 2002 and ended in May 2003. The remediation effort was successful in reaching the cleanup goals of 10 mg/kg PCBs for bank soils and 1 mg/kg PCBs in Raquette River sediments. It should be noted that while the cleanup level for surface soils is 10 mg/kg PCBs, the surface soils on the banks of the Raquette River do not exceed 1 mg/kg PCBs. However, at depths greater than one foot, soils meet the 10 mg/kg cleanup level. Over 10,000 cy of soil were removed from the Raquette River Banks as part of this remedial effort. Of that, approximately 7,420 cy was contaminated with PCBs above 10 mg/kg and shipped to an off-site disposal facility. Approximately 1,440 cy of sediments was dredged from the Raquette River.

Tribal Sediments (Turtle Cove)

GM had originally planned to remediate the Tribal sediments in Turtle Cove during the 1995 remediation of the St. Lawrence River. At that time, however, access to remove contaminated sediments was denied. With the assistance from the SRMT's Environment Division, access was

granted in October 2004. Following the dewatering of the cove, GM excavated contaminated sediments (greater than the Tribal sediment clean up standard of 0.1 mg/kg PCBs) from Turtle Cove from October 2004 through March 2005.

Tribal Soils

GM had attempted to gain access to Tribal properties for a number of years to remediate contaminated soils and sediments on three properties in SRMT lands. Access was granted to remove contaminated soils from one of these properties in October 2004. All soils greater than the Tribal soil clean up standard of 1 mg/kg PCBs were removed from this property.

Approximately 18,240 cy of soils and sediments with PCB concentrations greater than 10 mg/kg and 15,300 cy of soils and sediments with PCB concentrations less than 10 mg/kg were removed during the excavation of the Cove and upland soils.

Access is still needed for soils on two additional properties with low levels of PCBs. EPA will work with the St. Regis Mohawk Tribe to obtain access to remediate these additional properties.

Soils North East of the Industrial Landfill

Remediation efforts related to the excavation of PCB-contaminated soils in the NEILF was performed from May 2003 and December 2004. The area had been defined from previous soil investigation programs and was focused on removing a lens of contaminated soils which acted as a primary conduit of contaminated ground water from under the ILF to sediments and surface water in Turtle Cove and, ultimately, into the St. Lawrence River.

In order to excavate the contaminated soils at depths, clean overburden soil was removed and placed in an on-site containment cell. Approximately 5,050 cy of contaminated soils were then removed from the excavation area. By the end of September 2003, all contaminated soils above the 10 mg/kg cleanup level had been removed and backfill of the excavation pit and construction of a ground water collection sump began.

Backfilling and sump construction were completed in October 2003. The sump was designed to collect ground water moving into the area from the ILF. The sump has been operated continuously from October 2003. Collected ground water is being transferred by truck to GM's wastewater treatment system (WWTS). In March 2004, GM submitted a proposal to automate the sump and force-main collected ground water directly to the WWTS. The automated sump system was brought on line in December 2004.

Institutional Controls Implementation and Other Measures

Fish advisories have been posted for the entire St. Lawrence River, as well as Turtle Cove, to prevent or limit exposure to contaminated fish.

Institutional controls to prevent exposure of the public to contamination on the plant property are not necessary due to the plant's current high level of security. All personnel and visitors are required to access the site through two manned guard booths. With regard to the portions of the site which have not yet been remediated, controls are in place that reduce potential exposure to plant workers and site visitors. These controls and protective measures include:

- Deed notification identifying the plant as a contaminated site;
- Internal plant procedures requiring that any intrusive work be coordinated with the plant's Remediation Project Office to ensure that work is not conducted in contaminated areas; and
- Training of all newly-hired plant employees includes a discussion of the nature of the contamination on the site and the hazards associated with PCBs.

Contaminated surface soils are located on the EDA and NDA. The likelihood of on-site employee exposure to these soils is limited, since these areas are remote to the active plant manufacturing areas. While the perimeter of the EDA is fenced and is posted as an area which contains PCBs, a paved road traverses the EDA. Access to contaminated surface soils in the NDA is not restricted.

System Operations/Operation and Maintenance/Monitoring

To maintain the integrity and effectiveness of the ILF interim cap, routine O&M activities are necessary. The inspection/maintenance plan for the cap calls for regular inspection and evaluation of the cap, mowing the vegetation during the growing season, and fence maintenance. Repairs are to be made to the cap, as necessary, to control the effects of settling, subsidence, erosion or other events, and to prevent run-on from eroding or otherwise damaging the final cover. The final inspection/maintenance plan will incorporate long-term ground water monitoring, and the O&M of the ground water extraction and treatment facility.

The subaqueous sediment cap was inspected in 1996, 1997, and 2001 with an underwater video camera. Inspections indicated that the deep water cap needed no repairs, but some armoring along the near-shore areas was required. Repairs to the armor stone layer were made. Fish were monitored for five years after the completion of the cap to determine overall PCB body burden levels. Additional monitoring and inspections will continue.

Ground water is collected at the NEILF area, as well as at the 350,000-gallon lagoon. Data collected from the sumps from both ground water collection units are monitored.

The 10 million-gallon lagoon and the 500,000-gallon lagoon are currently an active part of the plant's wastewater treatment system. As such, these lagoons are scheduled to be remediated only when taken out of service. These lagoons will remain active for the foreseeable future. The PCB-contaminated wastes generated during routine maintenance of the active lagoons are regulated under

the Toxic Substances Control Act. As part of its ongoing O&M of these lagoons, GM has removed a considerable amount of PCB-contaminated sludges from these lagoons. It can be expected, that given the active role of these lagoons in removing PCBs from wastewaters at the site, these lagoons may become re-contaminated.

The ground water extraction and treatment system O&M, inspections, landfill maintenance, sampling, monitoring, data evaluation, and reporting costs are approximately \$79,000 on an annual basis; these costs are broken down in Table 2 (attached).

V. Five Year Review Process

Administrative Components

The five-year review team consisted of Anne Kelly (RPM), Michael Scorca (hydrogeologist), Marian Olsen (human health risk assessor), and Mindy Pensak (ecological risk assessor).

Document Review

The documents, data and information reviewed in completing the five-year review are summarized in Table 3.

Community Involvement

The EPA coordinator for the GM site, Leo Rosales, published a notice in the *Advance News* on May 15, 2005 and *Indian Time* on May 19, 2005, notifying the community of the five-year review process.

The notice indicated that EPA would be conducting a five-year review to ensure that the site is protective of public health and the environment and that the implemented components of the remedy are functioning as designed. It also indicated that once the review was completed, the results would be made available at the local site repositories. In addition, the notice provided the RPM's address and telephone number for questions related to the five-year review process. A similar notice will be published when the review is completed.

Data Review

St. Lawrence River

Biota sampling on the St. Lawrence River located adjacent to the GM facility was conducted annually from 1997 to 2001, with the collection of young-of-the-year spot-tail shiners (*Notropis hudsonius*). The sampling chronicled a five-year post-dredging time frame.

Spot-tail shiners were selected as the principal target species for the monitoring effort as an indicator species for monitoring the bioavailability of organochlorine residues because juveniles of this species have a limited home range, and the species are relatively short-lived with an average life span typically less than three years.

The limited home range and life span were of particular importance in monitoring the site. Ten acres of contaminated sediments were dredged in the St. Lawrence River. This area was located immediately adjacent to two areas with significant PCB contamination—the three-acre Turtle Cove to the immediate east and the 30-acre Reynolds Metals Company site to the immediate west. These areas had not, at the time, been dredged. It was recognized that any biota samples collected from the GM site could be subject to the influences of the two significant PCB sources in the immediate area.

Fish species observed in the capped area include spot-tail shiner, darters, carp, smallmouth bass, largemouth bass, northern pike, yellow perch, log perch, sculpin, white sucker, rock bass, drum, brown bull head, American eel, and black crappie. No physical anomalies were observed.

Analysis of the spot-tail shiner data did not reveal any obvious increasing or decreasing trends in PCB concentrations. During the five-year sampling effort, mean total PCB concentrations in spot-tail shiners ranged from 1.2 mg/kg to 3.7 mg/kg. Mean lipid-normalized PCBs varied from 13 mg/kg-lipid to 75 mg/kg-lipid. The lack of a clear trend between sampling years is reflected in the fact that the highest and lowest mean PCB concentrations were documented in successive years. The highest PCB concentrations occurred in 1998 and 2001, while the lowest PCB concentrations occurred in 1997 and 2000.

Post-dredging spot-tail shiner data can be found in Table 4.

It is anticipated that the Reynolds Metals Company site dredging and capping remedy will be completed in the near future. Collection of additional ecological data in the St. Lawrence River should be performed once the Reynolds Metals Company site effort has been completed. EPA will work with the appropriate government agencies to develop a modified St. Lawrence River biota sampling plan.

Ground Water Data Review

Ground water data were collected during the late 1980's during the RI/FS process leading up to the 1990 OU1 ROD. PCBs were detected at concentrations up to 1,300 µg/L in ground water associated with the site. VOCs were detected in some ground water samples with maximum vinyl chloride, dichloroethylene, and trichloroethylene concentrations of 50 µg/L, 686 µg/L, and 50 µg/L, respectively. The highest levels of PCBs and VOC contamination were detected in samples of ground water downgradient of the ILF.

Since the 1990 OU1 ROD was issued, additional ground water investigations were conducted in July

2000, October 2000, December 2003, and May 2004. PCBs were detected in some ground water samples, with a maximum concentration of 1,700 µg/L. VOCs were detected in ground water samples, with a maximum concentration of: vinyl chloride at 31 µg/L; dichloroethylene at 297 µg/L; and, trichloroethylene at 5 µg/L. Phenols were detected in some samples, with a maximum concentration of 21 µg/L. The highest levels of PCBs and VOC contamination were detected in samples of ground water downgradient of the ILF. The highest levels of phenol concentration were detected east-northeast of the Industrial Lagoons.

Maximum ground water concentration data can be found in Table 5.

Site Inspection

On April 11, 2005, a five-year review-related site inspection was conducted by EPA's Young Chang on behalf of the RPM.

Interviews

On June 6, 2005, the RPM, Anne Kelly, interviewed the SRMT project manager, Craig Arquette, for this five-year review. Mr. Arquette indicated that the SRMT Environment Division offices continue to get odor complaints from residents regarding emissions from the GM facility. He indicated that the odors are most likely related to styrene emissions from the manufacturing process.

Institutional Controls Verification

New York State now requires annual certifications that institutional controls that are required by RODs are in place and that remedy-related O&M is being performed. To comply with this requirement, on an annual basis, GM will need to certify that the institutional and engineering controls are still in place and that remedy-related O&M is being performed.

Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls

Table 6 (attached) summarizes several observations and offers suggestions to resolve the issues.

VI. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The RODs, as modified by the ROD amendment and the ESD, call for the removal of contaminated sludges and soils from the industrial lagoons and NDA, contaminated on-site soils, contaminated soils from the banks of the Raquette River, contaminated sediments in the hot spot area surrounding the GM Raquette River outfall, contaminated sediments from Turtle Cove, contaminated soils on Tribal lands, contaminated sediments in the St. Lawrence River, ground water extraction and treatment, containment of the ILF and the less contaminated material in the EDA.

The removal of on-site soils and sludges, with concentrations of PCBs greater than 10 mg/kg from the industrial lagoons has and will continue to result in a reduction of potential impacts to ground water from these areas and prevents exposures through direct dermal contact and inhalation of particulates to those soils and sludges above risk-based concentrations for industrial exposure.

The removal of contaminated soils from the banks of the Raquette River and contaminated sediments in the hot spot area surrounding the Raquette River outfall, has prevented direct dermal contact, ingestion and inhalation exposures to those soils and eliminates the potential for uptake of contaminated sediments by aquatic and piscivorous receptors in the Raquette River.

The removal of contaminated sediments from Turtle Cove and contaminated sediments in the St. Lawrence River, in addition to the Rivers physical constraints has prevented direct dermal contact, ingestion and inhalation exposures to these sediments and reduces the potential uptake of GM site related contaminants in sediment by aquatic and piscivorous receptors.

Extracting and treating the contaminated ground water will control the migration of contaminated ground water within the site boundary to ensure that ground water beyond the site boundary meets Applicable or Relevant and Appropriate Requirements (ARARs) for ground water. The purpose of permanently capping the landfill is to minimize the infiltration of rainfall and snowmelt into the contaminated landfilled mass, thereby reducing the potential for contaminants leaching from the landfill and negatively impacting ground water quality. Capping will also prevent potential direct contact exposures with the contaminated soils. The purpose of excavating the materials in the EDA with concentrations greater than 500 mg/kg PCBs and capping the remainder of the area will prevent direct contact exposure to contaminated soils.

Contaminated soils and sediments in the inactive lagoons, Raquette River, Turtle Cove, Tribal land, and the St. Lawrence River have been addressed as follows:

Inactive Lagoons

A total of 19,605 cy of contaminated soils and sludges were removed from the inactive lagoons. The 350,000-gallon lagoon lies immediately adjacent to the GM wastewater treatment building and is also in close proximity to a number of vital plant utility lines. Given the physical constraints, excavation was limited on the southeast side of the lagoon, in order protect the integrity of the wastewater treatment building. Since the 10 mg/kg PCB cleanup level could not be met in this area, a localized ground water collection system was constructed at the location of the 350,000-gallon lagoon. Ground water at this location is collected and treated in the plant's wastewater treatment system. This, in addition to the excavation, ensures the protectiveness of the remedy by reducing the potential for migration of contaminants that could not be excavated.

Raquette River Bank Soils

Post-remediation soil data collected on the banks of the Raquette River indicated that all soils above

10 mg/kg PCBs were removed. Flood plain soils were removed to 1 mg/kg PCBs and bank surface soils were remediated to 1 mg/kg PCBs. Soils at depth greater than 1 foot met the 10 mg/kg level.

St. Lawrence River Sediments

Despite extensive dredging of the St. Lawrence River, the cleanup goal of 1 mg/kg PCBs was not achievable. As a result, a two-acre area which had an average concentration of 27 mg/kg PCBs was capped to achieve the cleanup goal. The remaining exposed sediments average 3 mg/kg PCBs, which is marginally above the cleanup goal. Based on the physical hazards, limited access, and currents within the St. Lawrence River in the dredged area, it is anticipated that swimming and wading in the river in this area is unlikely. Additionally, the overall reduction in sediment concentrations within this area will further reduce potential risks in the unlikely event that an individual recreates within this area.

Raquette River Sediments

Post-dredging data indicate that the dredging of the Raquette River was successful in meeting cleanup goals. However, EPA requested that GM sample certain downstream areas located on Tribal land to determine if there were any downstream impacts to the Raquette River. These samples were collected in early July 2005; the analytical results have not yet been received.

Turtle Cove Sediments

All contaminated sediments above the Tribal clean level of 0.1 mg/kg PCBs were removed from the cove.

Tribal Soils

Post-excavation sampling data from the properties on which access was granted indicate that the clean up level of 1 mg/kg was achieved.

Remediation in the following media/areas has not been fully implemented:

Ground Water

The design of the ground water extraction and treatment system is currently underway. It is anticipated that it will be completed by the end of 2005. The current and historic data suggest that collection and treatment of all downgradient ground water will be effective.

Industrial Landfill

GM began the engineering design of the landfill containment remedy in 1992.

While EPA is confident that the selected remedy is protective of public health and the environment, there is strong public opposition to the containment remedy. Specifically, the SRMT objects to the containment of the unlined landfill in close proximity to the border with Tribal lands. Due to the public opposition, the landfill remedy has not been implemented. EPA continues to discuss alternatives with the Tribe, GM, and the community.

Additional sampling was performed to further characterize the landfill wastes and a geotechnical analysis was also performed. The investigation indicated that the interim cap continues to remain protective. The geotechnical analysis indicated that the landfill is not subject to an unacceptable level of risk of failure due to a seismic event.

East Disposal Area

The EDA remedy includes the excavation of materials with PCB concentrations greater than 500 mg/kg and the containment, under Resource Conservation and Recovery Act-compliant cap, of materials with concentrations less than 500 mg/kg PCBs. Given the fact that highly contaminated PCBs would remain on-site, the SRMT objects to the remedy for the EDA. EPA continues to discuss alternatives with the Tribe, GM, and the community.

North Disposal Area

While the SRMT concurs with the excavation of soils with PCB concentrations greater than 10 mg/kg, given the large volume of waste, it is expected that this area will be addressed when the issues related to the ILF and EDA are resolved.

Tribal Soils

PCB-contaminated soils are located on two privately-owned, unfenced, and uncontrolled properties located on SRMT lands that have not been remediated due to the inability to obtain access. EPA's risk analysis indicates that exposure to these soils falls within EPA's acceptable level of risk. Action is needed, however, since the soils exceed the SRMT's ARAR of 1 mg/kg for PCBs.

Summary

The components of the implemented remedies described above are functioning as intended by the decision documents. It is expected that once they are implemented, the remaining portions of the remedy will function as intended by the decision documents, as well.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy still valid?

Since the RODs were signed, there have been a number of actions at the site which have interrupted the exposure pathways, as described above. These actions have reduced the concentration of PCBs

in the river sediments and interrupted potential direct exposure to contaminants. The following sections describe the actions at the site, the effect of these actions on risks, and further evaluation that may be necessary.

St. Lawrence River

Based on the physical hazards, limited access, and currents within the river, it is anticipated that swimming and wading into the St. Lawrence River at the site in the dredged area is unlikely. Additionally, the overall reduction in sediment concentrations within this area will further reduce potential risks in the unlikely event that an individual recreates within this area.

While analysis of the spot-tail shiner data collected for five years did not reveal any obvious increasing or decreasing trends in PCB concentrations; it is anticipated that the remediation of other nearby contaminated sediment sources will have a positive impact by reducing the concentration of PCBs in fish. Collection of additional ecological data in the St. Lawrence River will be performed over the coming years.

Raquette River Sediments

Post-dredging data indicate that the dredging of the Raquette River was successful in meeting cleanup goals of 10 mg/kg PCBs for bank soils and 1 mg/kg PCBs in the sediments. Based on current exposure assumptions and toxicity information these values remain protective for both worker and residential exposures through ingestion and dermal contact.

Turtle Cove

The potential exists that individuals may wade and swim within Turtle Cove. Post-excavation data indicate that all PCBs greater than 0.1 mg/kg have been removed. Based on current exposure assumptions and toxicity information, these values are protective of children and adults based on exposure age-specific exposure assumptions that include 350 days/year for 70 years.

Fish, Waterfowl and Snapping Turtle Consumption

At the current time, the New York State Department of Health (NYSDOH) continues to issue fish consumption advisories for the St. Lawrence River (whole river) and the embayment at the St. Lawrence/Franklin County Line (also known as Turtle Cove). The advisories (2004/2005) include recommendations to “eat none” for American eel, channel catfish, lake trout over 25 inches long, carp, brown trout over 20 inches long, and chinook salmon. The advisories are based on PCBs, mirex, and dioxin contamination in fish. The recommendation to “eat no more than one meal per month” of white perch, white sucker, rainbow trout, smaller lake trout, smaller brown trout, and coho salmon over 25 inches long is based on PCB, mirex, and dioxin contamination.

Women of childbearing age, infants and children under the age of 15 years are advised to not eat any

fish species from the above listed waters. At Turtle Cove, the current recommendation is to eat no species. In spite of the fact that cleanup levels in Turtle Cove have been met, this advisory will remain in place and the recommendation will be re-evaluated by NYSDOH during the development of the annual future advisories.

Women of childbearing age, infants and children under the age of 15 years should avoid eating snapping turtles or soups made with their meat based on PCB contamination. General advisories exist against consumption of Mergansers, which are the most heavily PCB-contaminated waterfowl species.

Source: NYSDOH 2004-05 Health Advisories available at www.health.state.ny.us/nysdoh/fish/fish.htm.

Studies conducted by NYSDOH have indicated that fish advisories are effective in reducing fish consumption and recommend continued community outreach¹.

Changes in Toxicity and Exposure Assumptions

Consistent with the 1990 PCB guidance entitled *A Guide on Remedial Actions at Superfund Sites with PCB Contamination* (OSWER Directive 9355.4-01 FS), the remedial goals for PCBs in site soil established in the RODs are 1 mg/kg for residential properties and 10 mg/kg for industrial properties. Since the RODs were issued, EPA reassessed the cancer toxicity of PCBs. This reassessment resulted in a reduction of the PCB cancer slope factor from 7.7 mg/kg-day⁻¹ to 2 mg/kg-day⁻¹ for fish ingestion, sediment and soil ingestion, dust or aerosol inhalation, and dermal exposure (see www.epa.gov/iris chemical file for polychlorinated biphenyls). The externally peer-reviewed report was issued in September 1996 and, subsequently, an Integrated Risk Information System Chemical file for PCBs was developed and is now available at www.epa.gov/iris. In addition, new guidance was developed in the late 1990s and finalized in 2002 that provides methodologies for assessing dermal exposures to PCBs and other chemicals. The impacts of these changes in toxicity and exposure assessment resulted in the determination that the original cleanup goals for PCBs for residential and industrial properties are protective.

The noncancer toxicity values for Aroclor 1016 and Aroclor 1254 are also available on the IRIS system (www.epa.gov/iris). These toxicity values have not been modified since they were originally entered onto the system on January 1, 1993 and October 1, 1994, respectively. The toxicity values of 1 mg/kg and 10 mg/kg for residential and industrial exposures are consistent with the noncancer toxicity values.

¹ Fitzgerald, E.F., Hwang., Brix, K.A., Bush, B. Cook, K., and Worsick, P. *Fish Pcb Concentrations and Consumption Patterns among Mohawk Women at Akwesasne*, Journal of Exposure Analysis and Epidemiology 5:1, 1995 and New York State Department of Health, *Local Fish Consumption and Blood PCB levels among Women at Akwesasne*, October 2002.

Residential Soils

Residential properties where access was granted for remediation meet the residential cleanup goal of 1 mg/kg PCBs. This value remains protective.

Industrial Landfill

The interim cap was completed in 1988 and provides a barrier to potential exposure to the PCB-contaminated materials through ingestion of contaminated soil and dermal contact with soil. It also eliminates contaminated runoff from the landfill and minimizes leachate generation. There are no significant changes in site use expected over the next five years from the current industrial land use designation.

Ground Water

For this five-year review, the evaluation of ground water focused on two primary exposure pathways—direct ingestion (as a potable or drinking water source) and the possibility of vapor intrusion if buildings were to be constructed over the plume. Data used for this analysis was collected within the past five years.

The evaluation of the direct contact pathway with contaminated ground water showed that this is not a completed pathway, since nearby residents and on-site workers obtain drinking water from a public water system that meets appropriate standards. The maximum concentration found from sampling over the past five years was compared to the detected ground water concentrations associated with residential exposures. The residential risk based concentrations for drinking water consumption were based on a cancer risk ranging from one in a million to one in ten thousand and a noncancer Hazard Index (HI) = 1 for individual chemicals. The calculated risks assume consumption of ground water by an adult resident at the rate of 2 liters/day, 350 days/year, for a period of 24 years and a child resident exposed at the rate of 1 liter/day, 350 days/year for a period of six years. EPA screened the maximum concentrations found in ground water from the past five years against the Region IX Preliminary Remediation Goals that are concentrations in ground water calculated using the above-mentioned exposure assumptions, toxicity values and risk levels. The results of this analysis are provided in Table 5 for trans-1,2-dichloroethylene, total phenols, PCBs (Aroclor 1016 and 1254), trichloroethylene and vinyl chloride.

PCB concentrations in ground water are equivalent to a future cancer risk of 5×10^{-2} and an HI of 2,328 assuming an Aroclor 1254 pattern and a PCB concentration of 1,700 µg/L (highest concentration recorded in August 2000 in MW 306). This well was abandoned and the next highest concentration found was 330 µg/L, which also exceeds the risk range. Comparable calculations for an Aroclor 1016 pattern found unacceptable risks under this future scenario for both 1,700 µg/L and 330 µg/L.

The future risks associated with vinyl chloride were calculated as equivalent to approximately 6 x

10^{-3} and a noncancer HI = 1.7. This well was abandoned. The next highest concentration of $37 \mu\text{g/l}$ was found in the December 2003 sampling at well MW-16A. The future cancer risk associated with this concentration was 1.5×10^{-4} and the noncancer HI was less than 1.

The future risks associated with the trichloroethylene were calculated at approximately equivalent to 2×10^{-4} at a concentration of $5 \mu\text{g/L}$ (the on-site ground water cleanup level for this VOC is based on the MCL and the highest concentration recorded during the December 2003 sampling event). The future noncancer HI was less than 1.

The future noncancer HI associated with exposure to trans-1,2-dichloroethylene was approximately 119. This future noncancer HI was associated with the concentration found at well MW-304 during the August 2000 sampling event.

The evaluation of the noncancer HI for total phenols found the noncancer HI was less than 1.

Vapor Intrusion

A separate evaluation was conducted for potential vapor intrusion by comparing maximum concentration in ground water to the risk-based vapor intrusion values identified in *OSWER Guidance for Evaluating Vapor Intrusion to Indoor Air Pathway from Ground Water and Soils*. This analysis showed that the concentrations of vinyl chloride and trichloroethylene exceed the respective ground water screening criteria for residential soil vapor intrusion values of $0.25 \mu\text{g/L}$ and $0.053 \mu\text{g/L}$ at a risk level of 1×10^{-6} .

Further evaluation of these values demonstrated that the concentrations are associated with the upper bounds of the risk range based on residential land use. The current draft guidance only provides residential values for comparisons. Further evaluation of these values demonstrated that the concentrations are associated with the upper bounds of the risk range based on residential land use. The concentrations reported were obtained from wells within the landfill toe of the slope where future construction is not feasible. Based on the current industrial land use, well locations where the maximum concentration was found, and ground water flow, it is unlikely any current buildings would be impacted by vapor intrusion. The current institutional controls provide additional protection against potential exposures to indoor vapors. This issue should be re-evaluated at the next five-year review using sample data collected during this period.

Soils

Soil contamination exists on residential property. However, in 2005 the highest concentrations of PCB-contaminated residential soils (found at sample locations S-350 and S-350A) were removed. An evaluation of the remaining contaminated residential soils was conducted. This risk evaluation used the data from 41 samples, assumed one half of the detection limit for all non-detectable data and found a concentration of 0.8 mg/kg PCBs based on an upper confidence limit on the mean. This concentration is associated with a noncancer HI of 0.8 and a cancer risk of 4×10^{-6} which are within EPA's acceptable risk range.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

There is no information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

Based upon the results of the five-year review, it has been concluded that:

- The interim cap and vegetative cover are intact and in good condition;
- The fence around the site is intact and in good repair;
- The monitoring wells are functional;
- There is no evidence of trespassing or vandalism;
- Fish advisories have been posted for the entire St. Lawrence River to prevent or limit exposures to contaminated fish. Contaminated sediments have been addressed and post-remediation monitoring will continue in order to assess the protectiveness of this portion of the remedy; and
- Other than the implementation of access restrictions to prevent potential employee exposure to contaminated surface soils located on the EDA and NDA and the completion of the selected remedies, no additional interim measures are needed to protect public health².

Although the selected remedy calls for permanently capping the ILF, an interim cap was placed on the ILF in 1987-1988, thereby interrupting direct contact (*i.e.*, ingestion or dermal contact with soil) exposures to the public and preventing the potential for runoff. Contaminated soils are being addressed or have been addressed through removal and backfilling with clean soil. This approach reduces or eliminates on-site exposures through dermal contact and ingestion. Potential impacts of contaminated soil and sludges on ground water are being addressed or have been addressed through removal of the contaminated sources. Limited ground water extraction and treatment actions are addressing some of the contaminants in the ground water. The community utilizes public water that is routinely monitored and meets appropriate state and federal standards.

² While PCB-contaminated soils and sediments are located on two privately-owned, unfenced, and uncontrolled properties located on St. Regis Mohawk Tribal lands that have not been remediated due to the inability to obtain access, EPA's risk analysis indicates that exposure to these soils falls within EPA's acceptable level of risk. Action is needed since some of these soils exceed the SRMT's ARAR of 1 mg/kg for PCBs.

VIII. Issues, Recommendations, and Follow-Up Actions

Table 7 (attached) summarizes the recommendations and follow-up actions stemming from this five-year review.

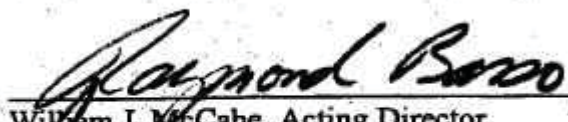
IX. Protectiveness Statement

The implemented actions at the site protect human health and the environment in the short-term. The remedy will be fully protective once the remaining remedial measures called for in the RODs are implemented.

X. Next Review

Since hazardous substances, pollutants or contaminants remain at the site which do not allow for unlimited use or unrestricted exposure, in accordance with 40 CFR 300.430 (f) (4) (ii), the remedial action for the site shall be reviewed no less often than every five years. EPA will conduct another five-year review on or before July 2010.

Approved:



William J. McCabe, Acting Director
Emergency and Remedial Response Division



Date

Table 1: Chronology of Site Events	
1959	GM Powertrain commences operation
1980	GM ceases disposal of PCB containing materials on-site. Closure Plans submitted to NYSDEC and EPA for sludge deposit areas (NDA and EDA)
1983	Site listed on NPL
1984-89	GM and EPA negotiate RI/FS Consent Order GM performs multi-phase remedial investigation and studies
1987-88	GM places an interim cap on Industrial Landfill
1990	EPA issues Record of Decision (OU1)
1992	EPA issues Record of Decision (OU2)
1992	Supplemental data collection performed
1994	GM performs wetland/floodplains/cultural resources assessment GM submits design plans to address stormwater controls GM performs treatability study
1994	GM submits preliminary design for ground water, ILF and EDA
1995	EPA issues Proposed Plan to raise treatment threshold; EPA receives thousands of comments objecting to the plan
1995	GM successfully dredges St. Lawrence River GM constructs stormwater controls system
1996	Post-remedial annual monitoring of St. Lawrence River initiated Discussion regarding ROD Amendment continue
1998	EPA requests additional ground water and landfill studies GM submits
1999	EPA issues ROD Amendment for OU1
1999	GM disposes of stockpiled St. Lawrence River sediments

1999	GM performs additional Raquette River, ground water and landfill sampling
2000	GM Submits Industrial Landfill geotechnical analysis
2000	EPA issues ESD for limited portions of OU1
2000-01	Ground water sampling and abandonment of obsolete wells
2000	EPA approves inactive lagoons design; lagoon remediation begins
2002-03	Raquette River remediation completed
2002	Inactive lagoons soil remediation completed
2003	GM performs excavation of soil northeast of the Industrial Landfill
2003	GM installs ground water sump and force main piping at the 350,000-gallon lagoon
2004-05	Turtle Cove Sediments and partial upland soil removal completed

Table 2: Annual Operation, Maintenance, and Monitoring Costs	
Activity	Cost per Year
St. Lawrence River Cap Inspection and Maintenance	\$15,000
Ground Water Monitoring, Sampling and Analysis	\$4,000
Site Inspection/Maintenance	\$60,000
<i>Total Estimated Cost</i>	<i>\$79,000</i>

Table 3: Documents, Data, and Information Reviewed in Completing the Five-Year Review	
Document Title, Author	Date
Record of Decision for OU 1 at General Motors Corporation, Central Foundry Division, Massena, NY, EPA	1990
Record of Decision for OU 2 at General Motors Corporation, Central Foundry Division, Massena, NY, EPA	1992
Record of Decision Amendment (OU 1), General Motors Corporation, Central Foundry Division, Massena, NY, EPA	1999
Explanation of Significant Difference OU1, General Motors Corporation, Central Foundry Division, Massena, NY, EPA	2000
Draft Remedial Investigation Report for Remedial Investigation/Feasibility Study at GMC – CFD Massena Facility - Volume I, RMT	1986
Draft Remedial Investigation Report for Remedial Investigation/Feasibility Study at GMC – CFD Massena Facility - Volume II, RMT	1986
Phase II Remedial Investigation Addendum Report for Remedial Investigation/Feasibility Study - Appendices, RMT	1988
Draft Feasibility Study for the Remedial Investigation/Feasibility Study GMC – CFD Massena Facility, RMT	1989
Preliminary Design Report for the Industrial Landfill, East Disposal Area/Containment Area and Site-Wide Ground Water Controls - Volume I, Camp Dresser & McKee	1994
Preliminary Design Report for the Industrial Landfill, East Disposal Area/Containment Area and Site-Wide Ground Water Controls - Volume II, Camp Dresser & McKee	1994
Fish PCB Concentrations and Consumption Patterns Among Mohawk Women at Akwesasne, Journal of Exposure Analysis and Epidemiology, Fitzgerald, E.F., Hwang, Brix, K.A., Bush, B., Cook, K., and Worsick, P.	1995
St. Lawrence River Sediment Removal Project Remedial Action Completion Report, BBL Environmental Services	1996
St. Lawrence River Monitoring and Maintenance Plan, BBL Environmental Services	1996

Table 3: Documents, Data, and Information Reviewed in Completing the Five-Year Review	
St. Lawrence River Monitoring and Maintenance Annual Report, BBL Environmental Services	1998
St. Lawrence River Monitoring and Maintenance Annual Inspection Report, BBL Environmental Services	1999
Industrial Landfill/GWCT Sampling & Analysis Report, Camp Dresser & McKee	2000
St. Lawrence River Monitoring and Maintenance Annual Inspection Report, BBL Environmental Services	2000
Industrial Landfill, General Motors Corp., Massena, New York, Camp Dresser & McKee Subsurface Investigation and Stratigraphy Parameters for Stability Analysis	2000
Wastewater Treatment System Interim Solids Removal & St. Lawrence River Sediment Disposal Completion Report, BBL Environmental Services	2000
Raquette River Bank Sampling & Analysis Report, Camp Dresser & McKee	2000
Ground Water Monitoring and Well Abandonment Work Plan, BBL Environmental Services	2000
St. Lawrence River Monitoring and Maintenance Annual Inspection Report, BBL Environmental Services	2001
Ground Water Monitoring and Well Abandonment Completion Report, BBL Environmental Services	2001
Inactive Lagoons Interim Completion Report, GM Powertrain, Massena, NY, BBL Environmental Services	2001
Local Fish Consumption and Blood PCB levels among Women at Akwesasne. New York State Department of Health, Center for Environmental Health	2002
350,000 Gallon Lagoon, Final Design Specifications, General Motors Powertrain, Massena, NY, REALM	2003
Revised Final Specifications, Renovating the Former 350,000 Gallon Lagoon, General Motors Powertrain, Massena, NY, BBL Environmental Services, Inc.	2003
Ground Water Sampling Work Plan -2003, General Motors Powertrain, Massena, NY, BBL Environmental Services	2003
Raquette River Bank Site Remedial Action Completion Report, General Motors Powertrain, Massena, NY, BBL Environmental Services	2004

Table 3: Documents, Data, and Information Reviewed in Completing the Five-Year Review	
Cove Remedial Action Work Plan, GM Powertrain, Massena, NY, Severson Environmental Services, Inc. and BBL Environmental Services	2004
Environmental Monitoring and Clean-Up Confirmation Work Plan GM Powertrain, Massena, NY, BBL Environmental Services	2005
Site-Wide Ground Water Controls, Final Design Report, Text (Volume 1 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Ground Water Controls, Final Design Report, Drawings(Volumes 2 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Ground Water Controls, Final Design Report, Technical Specifications (Volume 3 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Ground Water Controls, Final Design Report, Draft CQAP Text (Volume 4 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Ground Water Controls, Final Design Report, Draft Post-Closure Monitoring Plan (Volume 5 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Site-Wide Ground Water Controls, Final Design Report, Draft Post-Closure O&M Manual (Volume 6 of 6), General Motors Powertrain, Massena, NY, Camp Dresser & McKee	2004
Draft Soils Northeast of the Industrial Landfill Remedial Action Completion Report, GM Powertrain, Massena, NY, BBL Environmental Services	2005
Monthly Progress Reports	2000-2005
EPA guidance for conducting five-year reviews and other guidance and regulations to determine if any new Applicable or Relevant and Appropriate Requirements relating to the protectiveness of the remedy have been developed since EPA issued the ROD.	

Table 4: Post-Dredging Spot-Tail Shiner Data Collected at the GM Site				
Date	Number of Samples	Lipids (%)	Total PCBs-Whole Body Concentration (mg/kg)	Lipid-Normalized PCB (mg/kg-lipid)
10/97	7	5.58	1.20	22
10/98	7	4.54	3.59	79
10/99	7	9.22	2.43	27
10/00	7	11.4	1.5	13
10/01	7	5.00	3.7	75

Table 5: Comparison of Maximum Ground Water Concentration to Residential Risk-Based Concentrations Based on Region IX Preliminary Remediation Goals for Drinking Water

Chemical of Concern	Maximum Concentration (µg/L)	Concentration HI=1 (µg/L)	Cancer Risk 1 x 10 ⁻⁶ Concentration (µg/L)
trans-1,2 Dichloroethylene	297 ¹	2.5	n/a ¹
Phenols (total)	21 ²	11,000	n/a ²
PCB Aroclor 1254	1,700 ³	0.73	0.034
PCB Aroclor 1016	1,700 ³	2.6	0.96
Trichloroethylene	5 ⁴	9.5	0.028
Vinyl Chloride	119 ⁵	72	0.02

Notes:

1. The maximum concentration of 297 µg/l was found at well MW-304 during the August 2000 sampling event. The current IRIS file indicates that trans-1,2 dichloroethylene has not undergone a complete evaluation and determination under EPA's IRIS program for evidence of human carcinogenic potential (IRIS Chemical File for trans 1,2-dichloroethylene available on www.epa.gov/iris) and therefore toxicity values for a cancer evaluation are not available.
2. The maximum concentration of total phenols was found at well MW-16A during the August 2000 sampling event. The following summary of the Weight of Evidence for Carcinogenicity was developed based on the IRIS chemical file for phenols. Phenols are classified by EPA as a Group D carcinogen under the 1986 Cancer Guidelines. This classification indicates that phenols are not classifiable as to human carcinogenicity and therefore quantification of cancer risks is not possible (see IRIS chemical file for phenols at www.epa.gov/iris). Under the Draft Guidelines for Carcinogen Risk Assessment (EPA, 1999), the data regarding the carcinogenicity of phenol via the oral, inhalation, and dermal exposure routes are identified as *inadequate for an assessment of human carcinogenic potential*.
3. The maximum concentration in ground water of 1,700 µg/l was measured as total PCBs at well MW-306 on August 11, 2000. This well was subsequently abandoned and removed during excavation of the surrounding soils NEILF. The next highest concentration of PCBs was 330 µg/l and was found at well MW-16B on August 11, 2000. The available toxicity values for PCBs on IRIS are for total PCBs (cancer assessment) and Aroclors 1016 and 1254 for noncancer toxicity. The Region IX PRGs present concentrations associated with specific risk levels (i.e., cancer risk of 1 x 10⁻⁶ and a noncancer HI = 1) based on unspecified mixtures with low risk for Aroclor 1016 and unspecified mixtures with high risk for Aroclor 1254. This assessment provides a comparison of the maximum concentration of total PCBs in ground water and compares the results to the specific Aroclors based on Region IX calculations.
4. The maximum concentration of TCE was found at well MW-304 on August 11, 2000.
5. The maximum concentration in ground water of 119 µg/l was measured in well MW-306 on August 11, 2000. This well was subsequently abandoned and removed when the area was excavated during the NEILF soil removal. The next highest concentration found was 37 µg/l which was found in well MW-16A during the May 2004 sampling event.

Table 6: Other Comments on Operation, Maintenance, Monitoring, and Institutional Controls	
Comment	Suggestion
The selected remedies have not been fully implemented. While EPA is confident that the selected remedies are protective of public health and the environment, there is public opposition to the containment remedies selected for the East Disposal Area and the Industrial Landfill. Specifically, the St. Regis Mohawk Tribe (SRMT) objects to the containment of these unlined landfills in close proximity to the border with Tribal lands. EPA believes that the containment remedy for the landfill and the excavation and containment remedy for the EDA, in combination with the implementation of ground water controls, will eliminate the potential for exposure from these units.	Given the Tribe's objections, EPA continues to work with both the Tribe and General Motors, the potentially responsible party, to determine whether a remedy can be developed which is acceptable to both parties.
Contaminated soils and sediments are located on two privately-owned, unfenced, and uncontrolled properties located on SRMT lands that have not been remediated due to the inability to obtain access.	EPA continues to work with the Tribe in order to obtain access to complete this action.
New York State now requires annual certifications that institutional and engineering controls that are required by RODs are in place and that remedy-related O&M is being performed.	Annually, GM will need to certify that the institutional and engineering controls are still in place and that remedy-related O&M is being performed.

Table 7: Recommendations and Follow-Up Actions						
Issue	Recommendations and Follow-Up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Contaminated surface soils are located on the EDA and NDA. The likelihood of exposure to these soils is limited, since these areas are remote to the active plant manufacturing areas. While a perimeter portion of the EDA is fenced and is posted as an area which contains PCBs, a paved road traverses the EDA and an area of the EDA is not fenced or posted. Access to contaminated surface soils in the NDA is not restricted.	Access restrictions need to be implemented to prevent potential employee exposure to contaminated surface soils located on the EDA and NDA.	PRP	EPA	9/05	Y	Y

Table 8: Acronyms Used in this Document	
ARARs	Applicable or Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cy	Cubic Yards
EDA	East Disposal Area
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
HI	Hazard Index
ILF	Industrial Landfill
µg/l	Micrograms per Liter
NDA	North Disposal Area
NEILF	Northeast of the Industrial Landfill
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Transportation
O&M	Operation and Maintenance
PCBs	Polychlorinated biphenyls
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SRMT	St. Regis Mohawk Tribe
VOCs	Volatile Organic Compounds
UAO	Unilateral Administrative Order
WWTS	wastewater treatment system